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### X. Special Operations Peculiar Modification Kit (SOPMOD) Research Topics

X.1 General: CD ROM discs containing MS PowerPoint briefing slides that are indicative of SOPMOD research topics is available for general information only from Ms. Paula Pifer ([pifer\\_p@crane.navy.mil](mailto:pifer_p@crane.navy.mil)), who will mail one copy of this CD upon request to free-world interested parties. Topics are divided into SOPMOD Block 2 and SOPMOD Block 3 system objectives. Block 2 items are contemplated for fielding to forces within the next 1 to 4 years. SOPMOD Block 3 topics are contemplated for fielding in 5 to 10 years, however the fielding of Block 3 items may be accelerated based on project success and availability of funds.

X.1.1 General goals of both Block 2 and Block 3 include high user acceptance in day/night operational scenarios (operational suitability), to include suitability in nuclear, chemical, and biological environments, no batteries (objective) or standard batteries (threshold), light in weight, high durability, compactness and miniaturization, snag resistant ergonomic design, 66 threshold 99 objective foot depth waterproof, altitude air leak proof 30,000 feet (threshold) 50,000 feet (objective), 240 hours salt fog, and exceptionally high reliability, availability, and maintainability in marine, desert, NBC, and arctic environments.

X.1.2 The active power sources currently in use for SOPMOD systems are a commercially available battery equivalent to the Ba-3058/U 1.5 volt, AA size (NSN 6135-00-985-7845), the AA Lithium 3.9 volt size (Part Number 205129-006) and the DL 1/3 N 3Volt Battery (NSN 6135-01-398-5922). Most systems envisioned below will require the use of these batteries, although alternative batteries/power sources will be considered to achieve miniaturization or other performance increase.

X.1.3 All images shown below represent operational concepts only and no detailed design information should be inferred. Alternative configurations will be considered, however these image concepts depict current end-user operational needs. Interested parties should carefully read all topics, since many are inter-related.

X.1.4 Technical Points of Contact (TPOCs) are listed for each topic. TPOCs do not have the authority to obligate the government. Communications with members of the US Government, to include TPOCs, during the competitive period are strongly discouraged. TPOCs are not allowed to take phone calls regarding topics. Proposers may submit written questions by electronic mail to the TPOC. TPOCs have only a minor role in source selection. Any information TPOCs provide is for information only, and its use is at the risk of the reader. Questions to them and the answers they give, if any, will be posted on a public bulletin board [URL:](#)

X.1.5 Due to the requirements of full public disclosure of government information exchanges during the course of competitive process, interested parties are cautioned against exposing their own intellectual property during the competitive period prior to physical submission of

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final preliminary proposals. All final-submitted preliminary proposals will be treated as proprietary information unless otherwise marked.

X.1.6 Certain ongoing high-priority SOPMOD procurements do not appear below, since they are being conducted as Non-Developmental Item/Commercial Commercial Off The Shelf (COTS) acquisitions. NDI/COTS procurements are inappropriate for research topic proposals. These ongoing NDI/COTS projects include the Grenade Launcher Day/Night Sight Mount, the Enhanced Carbine-Carbine Reliability Parts Set, and Carbine Ergonomics. Potential proposers are cautioned to respond to these NDI/COTS procurements separately as they are published, unless some significant developmental advancement in these categories that is outside the scope of the cited NDI/COTS procurements is proposed.

X.1.7 Commercial NDI/COTS literature and product samples alone, without a preliminary proposal, will be rejected or passed into other acquisition processes, unless NDI/COTS items are submitted that can be significantly militarized/modified, and improved versions are of such strong government interest that the government is directed by users to prepare a counterproposal. Of interest in this regard, however, is the improvement, militarization, modification, recombination, or redesign of NDI/COTS items to meet Special Operations needs.

X.2 BLOCK 2 SYSTEMS (fielding in 2001 to 2005) topics:

X.2.1 Enhanced Combat Optical Sight (ECOS) and RCO



ECOS is a versatile, multi-function day optic with illuminated reticule for limited night capability. The ECOS shall have 3 integrated sighting capabilities. It shall have an open sight rail on top for quick reaction snapshooting and foul weather/back-up. This sighting capability should be the first sight set in the visual path as the weapon is raised to the eye. It shall also have a Close Quarter Battle optical capability having a fast, illuminated reticule, non-magnified or reflex collimator sight for rapid target acquisition from 0 to 200 meters. The ECOS shall also have a capability for optical long-range target recognition and engagement (4X-8X range - fixed, variable, or switchable power) optical sight capability for precision target engagement capabilities from 100 to 600 meters for point and 800 meters for area targets. The optic will have ballistic compensation designed into the reticule. All three sighting methods will have built in illumination for low-light use and will be compatible with Image Intensifier Module (see below). Optical goals may be achieved by stacked, packed, variable, or switchable optics. Further goals are 12:00, 3:00, and 9:00 MIL-STD 1913 rail surfaces on the sight body itself. ECOS will be provided in 3 variants: ECOS-C optimized for carbines and CQB, ECOS-SPR optimized for long-range precision fire, and ECOS-MG optimized for machinegun fire. Devices will have the ability to be repeatedly mounted and remounted to the weapon, retaining zero within ½ Minute of Angle (MOA) objective 1 MOA threshold and if batteries are required, will be powered by either 1.5v or 3v AA batteries or other available small batteries. ECOS may have other capabilities of rational cost and miniature size, to include video output, range finder

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integration, GPS sensor, flux-gate compass, remaining round count, temperature sensor/emergency heat level indicator, etc. RCO (Rifle Combat Optic) is a requirement tailored for USMC use. Required characteristics include 1 to 4 power fixed or variable (not yet determined) lightweight, highly durable, repeatable mounting (using 2 thumbnuts), optimized reticle design (USMC specific), internal adjustments with ballistic compensated elevation drum. Highly ergonomic design is required with long eye relief and wide range of suitable eye positions. Compatibility with the AN/PVS14 and simple reticle illumination is also desired. Ability to replace range drum or cam is also required (allow for use with other calibers than 5.56mm, such as 7.62mm).

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RCO TPOC: Mr. David P. Armstrong

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### X.2.2 Image Intensifier Module (I<sup>2</sup>M)



Night I<sup>2</sup> M imaging/aiming capability is desired which will be mountable and capable of integration with current optics and the ECOS. It shall have an open sight rail on top for quick reaction

snaphooting and foul weather/back-up, and for simple aiming should the system fail. This sighting capability should be the first sight set in the visual path as the weapon is raised to the eye. I<sup>2</sup>M shall not cause a point of impact shift with respect to the day optic zero. This device should incorporate the latest Night Vision tube/power supply technologies. An objective device would be a modular INOD. This would be accomplished by a 1 power, carbine sized, clip-on device where the day sight (ECOS, retro-compatible with ACOG 4x, ACOG Reflex, Army M68 CCOS, and various sniper optics) serves as the eyepiece to the night sight. Device will have the ability to be repeatedly mounted and remounted to the weapon, retaining zero within ½ Minute of Angle (MOA) objective 1 MOA threshold and will be powered by either 1.5v or 3v AA batteries or other available small batteries. The clip-on capability will allow future adaptation as clip-on technology matures and fuses with other night vision technologies.

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### X.2.3 Digital Daylight Image Video Module (DDIVM)



DDIVM is miniaturized daylight image capture device is desired for capturing still/moving images, allowing LPI/LPD digital transmission to the user's future devices, which will include a Heads-Up Display (HUD) and an external retransmitter. D2IVM will provide

operational capability of transmitting a real-time digital still or video image of the shooters-eye view. It will be compatible with ECOS, I2M and TIM. It may mount on the 12:00 rail or other rail. Device will have the ability to be repeatedly mounted and remounted to the weapon, retaining zero within ½ Minute of Angle (MOA) objective 1 MOA threshold and will be

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powered by either 1.5v or 3v AA batteries or other available small batteries. It will not interfere with aiming if and when in the top rail 12:00 rail position, and will be capable of mounting to the 3:00 and 9:00 rail positions as a stand-alone device or in conjunction with I2M and TIM.

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### **X.2.4 Thermal Image Module (TIM)**



TIM is an uncooled thermal imaging/aiming capability is desired which will be mountable and capable of integration with current optics and the ECOS. It shall have an open sight rail on top for quick reaction snapshooting and foul weather/back-up if it interferes with existing sight picture/sight alignment. TIM as envisioned would have a direct view screen output in line with a staring array type sensor. TIM shall not cause a point of impact shift with respect to the day optic zero. Device will have the ability to be repeatedly mounted and remounted to the weapon, retaining zero within ½ Minute of Angle (MOA) objective 1 MOA threshold and will be powered by either 1.5v or 3v AA batteries or other available small batteries. TIM may have other capabilities of rational cost and miniature size, to include video output, range finder integration, GPS sensor, flux-gate compass, etc.

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### **X.2.5 Enhanced Grenade Launcher Module (EGLM)**



The EGLM consists of three subsystems: the Enhanced Grenade Launcher (EGL), Self-Ranging Ballistic Sight (SRBS), and the Low-Velocity Pre-fragmented, Programmable High Explosive (LV-PPFE) 40 mm munition. The EGLM subsystem will re-package and integrate capabilities leveraged from the Advanced Lightweight Grenade Launcher (ALGL) program into a first-round-on-target, high reliability system that combines a new, robust grenade launcher (GL), a low-cost, day/night self-ranging ballistic sight (SRBS), and the Air Burst ALGL warhead in a compatible cartridge. Since self-ranging capability is not immediately available NDI/COTS, an interim Grenade Launcher Day/Night Sight Mount (GLDNSM) will be provided at the beginning of Block 2 that is retro-compatible with SOPMOD Block 1 aiming systems and the M203 9-inch SOPMOD variant, and designed for forward compatibility with future self ranging systems. The airburst capability will provide increased lethality/bursting radius through pre-fragmented, programmable high explosive warheads. The GLM will include advanced, automatic ranging, day/night fire control. It will allow for use of current 40mm grenades as well as a dual-purpose airburst warhead based on Advanced Lightweight Grenade Launcher (ALGL) technologies. The SOPMOD GLM will be configurable in the Carbine/Rifle-mounted arrangement and will also have a Quick Attach/Detach Buttstock for stand-alone firing mode.

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### X.2.6 Rangefinder Module (RM)



RM shall be a militarized version of currently available miniature commercial rangefinders. It shall have a MILSPEC 1913 rail grabber with an objective of attaching to or near the ECOS. It should be capable of integration with other components as well as having a stand-alone capability. It should emit a wavelength invisible to current night vision systems. Device will have the ability to be repeatedly mounted and remounted to the weapon, retaining zero within ½ Minute of Angle (MOA) objective 1 MOA threshold and will be powered by either 1.5v or 3v AA batteries or other available small batteries.

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### X.2.7 Integrated Pointer-Illuminator Module (IPIM)



IPIM will combine and improve upon the current capabilities represented by the AN/PEQ 5 Carbine Visible Laser, the AN/PEQ 2 IR Pointer Illuminator, and the Visible Light Illuminator. Desired capabilities include improved range in both IR and visible aiming and illumination. Various IR outputs are desired, maximum IR output setting is 100 mw or more. Visible laser output should be of a wavelength that is visible through currently issued laser protective optical coatings and is more distinct in daylight or in darkness as compared to the AN/PEQ-5. The IPIM should have a low power consumption visible and IR light capability integral to the main module. It should also have and an auxiliary or supplemental upgraded high output VLI module that is not dependent on internal IPIM power supply, but switchable through the main module. Device will have the ability to be repeatedly mounted and remounted to the weapon, retaining zero within ½ Minute of Angle (MOA) objective 1 MOA threshold and will be powered by either 1.5v or 3v AA batteries or other available small batteries.

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### X.2.8 Enhanced Shotgun Module (ESM)



ESM will provide a 12-gauge shotgun for door breaching and less-than-lethal operational capabilities. It will be operable both when attached to the carbine and when configured in the stand-alone mode, with ESN accessory pistol grip/buttstock.

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### X.2.9 Heat Source Detection Module (HSDM)



A module or weapon component is required to detect/locate persons hidden behind foliage, in buildings, etc. This device, module, or component shall allow for hand-held and weapon-mounted use.

The device may utilize a thermal energy sensor and may possibly be non-imaging. A visual feed to or near a day optic (ECOS) and auditory is the desired form of output. An intensity level indicator is also desired.

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X.2.10 Improved 5.56mm Ammunition - Improved 5.56mm ammunition is desired to allow for more flexible use of the M4A1 Carbine. Subsonic rounds are desired for close range engagements and for sentry suppression, 100 meters (threshold) to 200 meters (objective). A highly accurate no-lead (green) round is desired which can be used in place of M855 with improved accuracy and terminal ballistic performance. An over-the-beach round is desired which will allow the M4A1 Carbine to be fired and function while flooded with water. An enhanced reduced ricochet, low penetration round is desired for both training and close range engagements where ricochet and over penetration are concerns. An enhanced armor-piercing round is desired to achieve maximum performance against hard targets. Rounds that combine several or all of the above capabilities into a single round are of special interest.

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### X.2.11 Battery Recharger/Blasting Machine (BRBM)



A power system, which includes rechargeable small batteries and a hand powered charging device is desired to allow for field recharging of batteries. The active power sources currently in use for SOPMOD systems are a commercially available battery

equivalent to the Ba-3058/U 1.5 volt, AA size (NSN 6135-00-985-7845), the AA Lithium 3.9 volt size (Part Number 205129-006) and the DL 1/3 N 3Volt Battery (NSN 6135-01-398-5922), however, the capability of field-recharge of other common small batteries is also desired. A system objective of all Block 2 and Block 3 electric-powered items will be to have a charging portal that accepts the BRBM, allowing system recharge without removal of batteries. The charging device should also be usable as a blasting machine and to fire Claymore mines.

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### X.2.12 Shot Counter (SC)



SC is a module or weapon component that will enable armory personnel to easily determine the number of rounds fired through a barrel and identifies remaining service life of critical components. Many weapon parts, particularly barrels and bolts, are



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affected not only round count, but firing schedule/cadence; high temperatures and cyclic loads are among critical factors. A feature is required that automatically analyzes round count and historical firing cadences to indicate the condition of specific parts.

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### X.2.13 Over The Beach Receiver (OTBR)



A separate ongoing SOPMOD NDI/COTS acquisition project, the Carbine Reliability Parts Set (CRPS) has an objective of meeting this OTBR requirement. Should that objective fail, Carbine and/or Rifle parts and assemblies that are compatible with the

current carbine lower receivers will be required which will permit safe and effective firing of the weapon under water and immediately upon exit of the water without delay of draining the weapon prior to firing. OTBA Calibers sought, in order of priority, are 5.56x45mm NATO, 7.62x39mm, .357 Magnum, and .45 ACP.

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### X.2.14 Family of Muzzle Brake/Suppressors (FMBS)



Reduction in weapon flash and sound signatures are required for a variety of SOF weapons. Systems are envisioned to include, but not limited to (1) A small, ergonomic CQBR suppressor (2) A standard carbine suppressor (3) a high accuracy suppressor

for the SPR, and (4) a machinegun suppressor. While it is desired that one or two systems accomplish all objectives, the user understands that this is technically unlikely, and that several variants may be required.

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### X.2.15 Laser Protection and Protection from Optical Augmentation (LPPOA)



Protection devices and methods are sought to protect both the user and his optics and electro-optic systems from threat laser damage and laser optical detection. Also under this effort, LPD/energy-absorbing

camouflage paints, surface coatings and covers will be considered.

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### X.2.16 Sustained Fire Assembly (SFA)



Carbine and/or Rifle parts and assemblies, to include entire upper receiver group, that are compatible with the current carbine lower receivers are required which will permit safe and effective firing of the

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weapon under heavy sustained rates of fire. Belt fed capability is desired; increased magazine capacities/double magazines methods are threshold.

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### **X.2.17 Chamber Bore Sight (CBS)**

The CBS will fit in a standard 5.56 chamber and will project a visible beam that is aligned with the rifle bore to allow bore sighting both day and night sights and aiming lasers. Specialized batteries are allowed to meet objective of miniaturization. CBS will cut the time and ammunition required for zeroing in half. Adapters are required for other SOF weapons and calibers. Visible laser output should be of a wavelength that is visible through currently issued laser protective optical coatings and is more distinct in daylight in darkness as compared to the AN/PEQ-5 and current commercial red-light laser CBS products.

### **X.2.18 Enhanced Bayonet/Field Knife (EBFK)**



EBFK will be a fundamental field knife with the capability of attaching to the barrel of the carbine, rather than the bayonet stud, to allow it to be used on carbine and rifle barrels of various lengths. Its

fundamental utility will be as a field knife, with bayonet capabilities secondary.

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## **X.3 BLOCK 3 SYSTEMS (Fielding in 2005-2010) Topics:**

### **X.3.1 Integrated Carbine (IC)**



IC design will incorporate, through full system integration, of all the aspects of the M4 and its accessories mentioned above with the improvements that technology would provide by the year 2005. The IC will exploit emerging and advanced commercial

technologies for miniaturized advanced aiming capabilities, which can be integrated into small arms as components rather than be attached as modules. Currently, the M4A1 Carbine used by joint SOF utilizes a series of attachable modules for laser illumination and aiming, which are bulky, heavy, snag-prone, and sensitive to heat of extended firing. While the current generation of SOF operators is accustomed to the ergonomics of the M4A1 Carbine, the IC need not be based on the M4-M16 Family of weapons; other carbine systems may be utilized if ergonomic improvements are gained. The IC will re-package and integrate the capabilities found in current accessories into a single ergonomic, high reliability carbine system. These advanced technologies would also provide NVG compatible IR wide beam illumination for target identification and confirmation, as well as optical and visible aiming points, combined in one instrument. Further capabilities may include, but are not limited to, no-, low-, or centralized power, laser pointer/designator, modular component



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maintenance concept, sensor, and data fusion. Other technological pursuits associated with the integrated carbine would include the following:

X.3.1.1: Visible laser component for pointing/aiming to include pulsed beam and pattern generation and/or visual light illumination, in a visible wavelength that is detectable by the human eye through current laser protective coatings.

X.3.1.2: Near Infrared laser component for pointing/aiming to include pulsed beam and pattern generation and/or visual light illumination (low-medium-high power to reach 100 milliwatt or more output).

X.3.1.3: Near infrared diode component for short-range diffuse illumination.

X.3.1.4: Range finder component, information sent to display/reticule.

X.3.1.5: Automatic range finder/ballistic solution.

X.3.1.6: Optic component that contains all of the capabilities of ECOS, plus range indication, weapon cant/inclination, barrel temperature, remaining shot count in magazine, video signal export, and a variety of call-up information in the visual field.

X.3.1.7: Ergonomic and simple switching of modalities.

X.3.1.8: Retro-compatibility with I2M, TIM, ESM, FMBS, BRBM, EBFK, and GLM is required.

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### X.3.2 Sensor Fusion Module (SFM)



Sensor fusion imaging/aiming capability is required, which is to be mounted as a module in front of day optics, to include current optics, DSII, and the future IC Optic. It shall have an open sight rail on top for quick reaction snapshooting and foul

weather/back-up. This sighting capability should be the first sight set in the visual path as the weapon is raised to the eye. SFM will be attached directly to a Mil Std 1913 rail. SFM shall not cause a point of impact shift with respect to the day optic zero. This device should incorporate fused color image intensification and thermal sensing technologies as a minimum.

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### X.3.3 Improved 40mm Grenade and Other Enhanced Indirect Fire Munitions (EIFM)

Improve the family of 40mm munitions: Increased

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accuracy, range, target effect, grenade launcher versatility, and tactical performance.

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X.3.4 Miscellaneous: Any and all potential modular subsystems or components that may provide increased combat capability and operator survivability, and that may be attached to the MILSPEC 1913 mounting rails or elsewhere on the M16/M4/M203 series weapons. Also of significant interest are material and metallurgical improvements to all components, particularly barrels and bolts for endurance, and alternative durable, heat resistant composites.

TPOC not assigned.